

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN OR RELATING TO STEERING COLUMNS

(71) We, IMPERIAL METAL INDUSTRIES (KYNOCH) LIMITED, a British Company, of Kynoch Works, Witton, Birmingham B6 7BA, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to energy absorbing steering columns and has particular, but not exclusive, reference to steering columns of the upright or near-vertical type.

By the present invention, there is provided a vehicle comprising an energy absorbing steering column assembly, the column having at its upper end a steering wheel and at its lower end a joint capable of transmitting torque, the column being capable of moving at least in a forward direction about said joint, and energy absorbing means interconnecting the column and a fascia, dashboard or bulkhead of the vehicle, the energy absorbing means including a slug of solid extrudable material and being operable to extrude said material so as to absorb energy upon forward movement of the column about the joint towards the fascia, dashboard or bulkhead.

The energy absorbing means preferably comprises a piston in a cylinder containing the slug of extrudable material, the piston and cylinder being axially movable relative to one another, upon forward movement of the column about the joint, to extrude said material.

There may be two or more separate said energy absorbing means interconnecting the column and the fascia, dashboard or bulkhead. The slug may be an annular slug, and may comprise a plastics material. In one preferred embodiment, the slug is arranged to be back extruded upon forward movement of the column about the joint.

The joint may be a universal joint.

The steering wheel may be pivotally secured to the column.

The column preferably makes an angle of from substantially 60° to 90° to the horizontal.

By way of example, embodiments of the present invention will now be described with reference to the accompanying drawings of which:

Figure 1 is a side elevational view partly in section of a column and energy absorbing unit; and

Figure 2 is a partial view along the arrow II of Figure 1.

Referring to Figure 1, a steering column 1 is connected via a universal joint 2 to a steering box (not shown). The universal joint 2 is at the level of the floor 3 of the vehicle and a rubber gaiter 4 is used to restrict the entrance of draughts through the floor. At its upper end, the steering column 2 has a steering wheel 5 which is secured to the column by suitable splines in the normal manner. To support the steering column, there is a journal 6 in which the column can rotate and the journal is secured to the bulkhead 7 of the vehicle by means of a pair of energy absorbers 8 and 9 (Figure 2). Although the energy absorbers are shown attached to the bulkhead, they could be attached to the fascia or the dashboard or other equivalent structure forward of the steering column. It will be appreciated that reference to fascia, dashboard or bulkhead is meant to cover all such structures forward of the column. The energy absorbing units are secured at spaced-apart positions on the bulkhead to form a triangle to support the steering column under normal conditions.

The universal joint 2 permits the transfer of torque but also allows the steering column to bend without offering any significant resistance to bending. Obviously constant velocity joints or other suitable joints could be used instead of a simple universal joint.

When a load is applied to the steering wheel, the steering column 1 pivots in a forward direction about joint 2 so that the

energy absorbing devices 8 and 9 are compressed and absorb energy. Preferably the steering wheel can tilt to the position shown in thin lines in Figure 1 at 10, the energy absorbing devices then assuming the position in the thin line as 11.

Preferably the energy absorbing devices are devices which incorporate a slug of plastics material which is extruded by a piston acting inside the cylinders of the energy absorbing devices.

On tilting, the steering wheel may absorb energy by operating a form of energy absorber such as a friction pivot etc.

WHAT WE CLAIM IS:—

1. A vehicle comprising an energy absorbing steering column assembly, the column having at its upper end a steering wheel and at its lower end a joint capable of transmitting torque, the column being capable of moving at least in a forward direction about said joint, said energy absorbing means interconnecting the column and a fascia, dashboard or bulkhead of the vehicle, the energy absorbing means including a slug of solid extrudable material and being operable to extrude said material so as to absorb energy upon forward movement of the column about the joint towards the fascia, dashboard or bulkhead.

2. A vehicle as claimed in Claim 1 wherein the energy absorbing means comprises a piston in a cylinder containing the slug of extrudable material, the piston and cylinder being axially movable relative to one

another, upon forward movement of the column about the joint, to extrude said material.

3. A vehicle as claimed in Claim 1 or Claim 2 wherein the said extrudable material is back extruded upon forward movement of the column about the joint.

4. A vehicle as claimed in any one of Claims 1—3 wherein the slug is an annular slug.

5. A vehicle as claimed in any one of Claims 1—4 wherein the extrudable material comprises a plastics material.

6. A vehicle as claimed in any one of Claims 1—5 wherein said joint is a universal joint.

7. A vehicle as claimed in any one of Claims 1—6 comprising two or more separate said energy absorbing means interconnecting the column and the fascia, dashboard or bulkhead.

8. A vehicle as claimed in any one of Claims 1—7 wherein the steering wheel is pivotally secured to the column.

9. A vehicle as claimed in any one of Claims 1—8 wherein the column makes an angle of from substantially 60° to 90° to the horizontal.

10. A vehicle comprising an energy absorbing steering column substantially as described herein with reference to Figure 1 and Figure 2 of the accompanying drawings.

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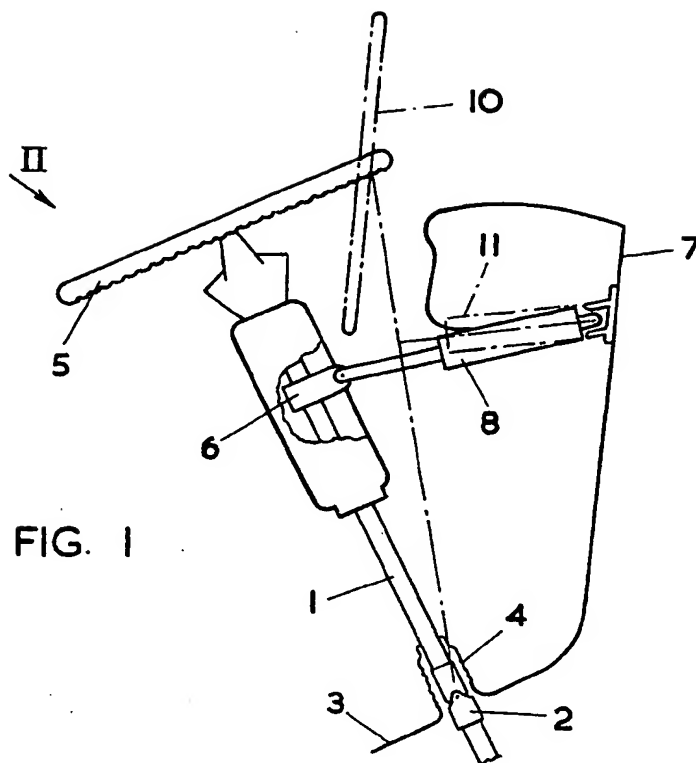


FIG. 1

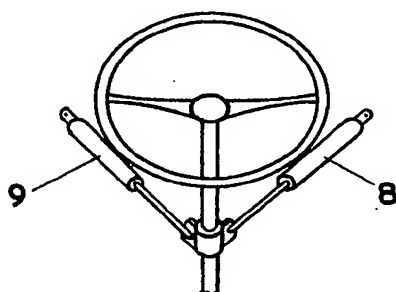


FIG. 2